

## **REMARKS**

By the present amendment, new claim 15 has been added. Further, claims 1 and 12-13 have been rewritten and amended as new claims 14, 16 and 17, respectively. Accordingly, claims 1 and 12-13 have been canceled and the dependencies of claims 2, 5, 9-11 have been amended.

Also, the specification has been amended to insert appropriate references to the Sequence Listing, and to clarify the term "ELISA" and trademark names.

Claims 2-11 and 14-17 are pending in the present application. Claims 2-8 and 14-15 are directed to a fusion protein, claim 9 is directed to a hybrid DNA, claim 10 is directed to a recombinant vector, claim 11 is directed to a recombinant Avipox virus, claim 16 is directed to a recombinant live vaccine and claim 17 is directed to a trivalent live vaccine.

As a preliminary, the Office Action includes a Notice to Comply with Sequence Listing Requirements.

A Sequence Listing in paper and computer-readable form is being submitted concurrently herewith.

Next, in the Office Action, the specification is objected to in connection with the use of trademarks. It is requested that trademark names be capitalized and a product name be indicated.

Reconsideration and withdrawal of the objection is respectfully requested. It is submitted that "ELISA" on page 22, line 23 is not a trademark but stands for Enzyme Linked ImmunoSorbent Assay. The specification has been amended to clarify this point. Further, the specification has been amended to capitalize and clarify that "GENE PULSER" on page 19, line 17, "IMMOBILON" on page 21, line 9, and "NEMBTAL" on page 24, line 22, are trademarks,

and that "NEMBTAL" is manufactured by Abbot. Accordingly, it is submitted that the objection should be withdrawn.

Next, in the Office Action, claim 13 is objected to as multiple dependent.

The objection to claim 13 as improperly dependent is respectfully traversed. Claim 13, now rewritten and amended as new claim 17, is properly dependent on "any of claims 11 and 16." Accordingly, it is submitted that the objection should be withdrawn.

Next, in the Office Action, claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as indefinite.

Reconsideration and withdrawal of the rejection is respectfully requested in view of the following.

First, it is alleged in the Office Action that, in claim 1, it is unclear whether the phrase "having the antigenicity of [MG]..." means "specific reactivity with" or "can cross react with",

Claim 1 has been rewritten as a new claim 14 in which the phrase "having the antigenicity of" has been replaced by "causing an antibody-antigen reaction with MG immune serum or MG infected serum," as discussed on page 6, line 14 of the present specification. It is submitted that this recitation is clear and definite to a person of ordinary skill in the art.

Second, it is alleged in the Office Action that, in claim 1, the term "derived from" is vague for lack of a definition in the specification.

The objection to the term "derived from" is respectfully traversed. The present specification contains a detailed definition and description of polypeptides derived from herpesvirus, in particular at page 8, lines 5-21 and page 9, lines 7-14, with reference to literature in the art. Further, a new dependent claim 15 dependent on claim 14 has been added, which

further clarifies that the polypeptide derived from herpesvirus outer membrane protein contains at least a signal sequence of the herpesvirus outer membrane protein, as discussed on page 8, line 15 of the present specification. Therefore, claims 14 and 15 are clear and sufficiently defined.

Third, it is alleged in the Office Action that, in claims 9-12, the term "hybrid DNA" lacks antecedent basis.

The objections to the term "hybrid DNA" is also respectfully traversed. The term hybrid DNA is properly introduced by the article "A" in claim 9. Support for the term "hybrid" is found throughout the specification, in particular on page 28, line 7. This term is immediately understood by a person of the art.

Fourth, it is alleged in the Office Action that, in claims 9-12, it is unclear which specific amino acids are required in the DNA sequence.

The objection to the recitation in claims 9-12 is also respectfully traversed. It is submitted that a person of ordinary skill in the art would immediately determine appropriate sequence(s) of amino acids based on the sequence of the fusion protein which must be expressed. Specifically, an antigenic gene of Mycoplasma gallisepticum is disclosed in the prior art, for example in WO 94/23019 (Sajto) which is cited in the Office Action. To obtain a hybrid DNA, the antigenic gene of Mycoplasma gallisepticum is connected with a signal DNA. As discussed in the present specification at page 8, a signal DNA or a membrane anchor DNA of herpesvirus can be used as the signal DNA or the membrane anchor DNA. In addition, the signal sequence and the membrane anchoring sequence are characterized by having a hydrophobic region at the carboxyl terminus or amino terminus thereof. These features are well known in the art, so that it would

not be difficult for a person of ordinary skill in the art to determine the signal sequence or the membrane anchoring sequence from a certain DNA.

Fifth, it is alleged in the Office Action that, in claims 12 and 13, the recitation of a vaccine is vague because "[the] antigenic polypeptide may not cause immunogenicity" and may not "be effective as part of a vaccine."

Claims 12 and 13 have been rewritten as new claims 16 and 17, respectively, which recite that the fusion protein is capable, upon administration into a host cell, of immunizing that cell against subsequent infection with MG. Support for this recitation is found in the present specification, in particular in Examples 5 and 6. It is submitted that this recitation is not vague, but clear and definite to a person of ordinary skill in the art.

In view of the above, it is submitted that the indefiniteness rejection should be withdrawn.

Next, in the Office Action, claims 1-10 and 13 are rejected under 35 U.S.C. 103(a) as obvious over WO 94/23019 which names Sajto as an inventor ("**Sajto**") in view of Yoshida et al., Virology, Vol. 200 (1994) ("**Yoshida**"), and claims 11-12 are rejected under 35 U.S.C. 103(a) as obvious over **Sajto** in view of **Yoshida**, and further in view of ("**Yangida**").

It is alleged in the Office Action that **Sajto** discloses the subject matter of claims 1-10 and 13 except the polypeptide derived from a Herpes outer membrane protein, and that **Yoshida** "suggests that FPV is a good candidate for an MDV vaccine and that gB is an important target for the host immune response," so that it would have been obvious to use the polypeptide derived from **Yoshida** with the fusion protein of **Sajto**.

With respect to claims 11-12, it is alleged that **Yangida** "teaches that recombinant Avipoxvirus genes are effective as vaccine," so that it would have been obvious to use the recombinant Avipox virus of **Yangida** with the fusion polypeptide of **Yoshida** and **Sajto**.

Reconsideration and withdrawal of the rejection is respectfully requested.

As pointed out in the Office Action, **Sajto** discloses that a terminal membrane anchor is connected to an antigenic gene of MG. **Sajto** also confirms that the polypeptide exhibits the antigenicity of MG. However, the signal membrane anchor which is disclosed in **Sajto** is a signal membrane anchor of HN gene of New Castle disease virus (NDV). Thus, **Sajto** contains no teaching or suggestion of the signal sequence and the membrane anchoring sequence of Herpesvirus. Moreover, in the Examples of **Sajto**, the antigenicity is not tested *in vivo*, but *in vitro* only.

Further, the inventors of the present invention have found that the signal membrane anchor of NDV cannot attain the desired effects as a vaccine *in vivo*. In order to illustrate this point, a Declaration under Rule 1.132 is submitted concurrently herewith. The Declaration is by Mr. Shuji Saitoh who is the first named inventor in the present application. As shown in the Declaration, chicken inoculated with the recombinant viruses of **Sajto** (fNZ7929-67, fNZ7929-66 and fNZ2929XM1) exhibit approximately the same average lesion score as non-inoculated chicken *in vivo* (see the Table at page 3 of the Declaration). The method for calculating the average lesion scores in the tests reported in the Declaration is the same as in the tests reported in the present specification, for example Table 3 on page 26. In particular, the line "None" in the Table on page 3 of the Declaration and in Table 3 on page 26 of the present specification are the same. Thus,

the test results in the Declaration confirm that the recombinant viruses of **Sajto** are not useful as vaccines for anti-Mycoplasma infection.

By contrast, the fusion protein of the presently claimed invention provides considerably better results than that of **Sajto**. Reference is made in particular to the test results for the fusion protein of the presently claimed invention on Table 3 on page 26 and Fig. 8 of the present specification, which can be compared to the corresponding test results for the fusion protein of **Sajto** in the Declaration. These test results show that the fusion proteins of the presently claimed invention are very effective as vaccines *in vivo*, as compared to the fusion proteins of **Sajto**.

In view of the above, **Sajto** fails to teach or suggest the fusion protein of the polypeptide having the antigenicity of MG and the polypeptide derived from Herpesvirus outer membrane protein of the presently claimed invention. Further, the other references cited in the Office Action, **Yangida** and **Yoshida**, fail to remedy the deficiencies of **Sajto**. Indeed, none of these references recognizes an important advantage described in the present application, i.e., that the signal sequence and the membrane anchoring sequence of Herpesvirus are more effective as a vaccine, as compared to the signal membrane sequence of HN gene of NDV. As a result, the present claims are not obvious over any combination of these references. Therefore, it is submitted that the prior art rejections should be withdrawn.

In conclusion, the invention as presently claimed is not obvious over the cited documents taken alone or in combination, and the invention as claimed is thus patentable. It is believed that the claims are in allowable condition and a notice to that effect is earnestly requested.

In the event this paper is not considered to be timely filed, the Applicants hereby petition for an appropriate extension of the response period. Please charge the fee for such extension and any other fees which may be required to our Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosures: Declaration under Rule 1.132  
Submission of Sequence Listing  
Petition for One-Month Extension of Time  
Check for \$ 110.00